Name_____

Period 1 2

Review Sheet for Pre-AP Chemistry
First Semester Final

Refer to your class notes, worksheets, and the textbook to complete this review sheet. Study early so that you will have time to ask questions about what you don't understand. **Do not forget to use your old Tests to also help you review for your semester final**. Most topic on the final are covered in the review sheet.

This must be completed in order to take the final

Matter: Anything that takes up space and has mass

Physical Changes and Chemical Changes

1. Define each. How can you tell the difference between the two?

Atom

2. For this Carbon–14 isotope, ${}^{14}_{6}C$

- Atomic number = _____, Mass number = _____,
- # of protons = _____, # of electrons = _____, # of neutrons = _____.

3. Atomic Masses: What is the difference between the mass number for Carbon–14 and carbon's atomic mass of 12.011 amu?

4. Calculate the atomic mass of lithium if one isotope has a mass of 6.0151 amu and a percent abundance of 7.59% and a second isotope has a mass of 7.0600 amu and a percent abundance of 92.41%.

Atomic Models:

5. Philosophers: Democritus (believed in atoms) and Aristotle (didn't believe in atoms)

Scientists: What was the contribution of each one's atomic model? Draw a model of each.

John Dalton

List the four postulates of Dalton's Atomic Theory:

J.J. Thompson

Earnest Rutherford

Quantum mechanical model (Werner Heisenberg):

- Energy levels (n=1, 2, 3, 4,…) – represented by periods on the periodic table
- Sublevels: (s, p, d, f) – represented by blocks on the periodic table
- Orbitals – region of space where up to 2 electrons may be found

6. What are the long hand and short hand configurations for the following atoms:

i) Mg

ii) P

iii) Br

7. Characteristics of subatomic particles

Particle	**Mass**	**Charge**	**Location in atom**
Proton			
Neutron			
Electron			

Periodic trends

8. Locate or define parts of the periodic table:
   a) Groups

   b) Periods

   c) Transition metals (d & f blocks) vs. Representative Elements (s & p blocks)

   d) Alkali metals, Alkaline Earth metals, Halogens, Noble Gases

9. What are the first 18 elements on the periodic table?

10. What are the trends for

   a) electromagnegativity

   b) atomic radiuos

11. a) Elements in the same _____ have similar physical and chemical characteristics because the
(group, period)
they have the same number of _____.
(atoms, protons, neutrons, electrons, valence electrons)

12. From their positions on the periodic table, what charges would the ions of Be and N have?

	Gains or loses electrons?	Symbol for ion		Gains or loses electrons?	Symbol for ion
Be			N		

13.
a) What type of electromagnetic radiation has a wavelength of $10x10^{-10}$m?

b) What is the frequency of a beam of photons with a wavelength of 330nm?

c) What amount of energy is produced by a 340nm wavelength of light?

14. Properties of Metals vs. Nonmetals vs. Metalloids

***Ionic vs. Molecular Compounds*:**

15. Ionic bonds are formed when a _____ and a _____ combine.

16. Metals lose electrons and form _____ while nonmetals gain and electrons form _____.

17. Molecular compounds form when a _____ and a _____ combine as they share electrons.

18. Identify the following pairs of atoms as potentially forming an ionic or molecular compound:
Mg and Cl _____ I and F _____ P and Cl _____

Ag and S _____ K and Br _____ Sn and O _____

Naming Covalent/ Molecular and Ionic Compounds

19. Naming covalent molecular compounds
Name: N_2O: _____ and NO_2 _____

20. Naming Ionic Compounds
a. Name: Li_2O _____ and $(NH_4)_2SO_4$ _____

b. Name: FeO _____ and $Sn_3(PO_4)_4$ _____

c. Name: $NaHCO_3$ _____ and $CuCl_2$ _____

Formulas of Molecular and Ionic Compounds

21. Write formulas for the following molecular compounds:
Phosphorous trihydride _____ dioxygen difluoride _____

Lead (II) hydroxide _____ chromium (III) sulfate _____

22. Write formulas for:
Ba^{2+} with OH^- _____ Iron (III) Sulfide _____

Na^+ with OH– _____ NH_4^+ with PO_4^{3-} _____ Magnesium Sulfite_____

Chemical Reactions

23. Define what is meant by the term *chemical reaction* and describe the parts.

24. In the following chemical equation, identify the **reactants** and the **products**.

$$3Ba(C_2H_3O_2)_{2(aq)} + 2Na_3PO_{4(aq)} \rightarrow Ba_3(PO_4)_{2(s)} + 6NaC_2H_3O_{2(aq)}$$

In the above chemical equation, what do the symbols *(aq)* and *(s)* stand for? What would the symbols *(l)* and *(g)* stand for in a chemical equation?

25. Chemical reactions can often be classified as one of five types. Write the general form for each type of reaction.

a) Synthesis
b) Decomposition
c) Single-Replacement
d) Double-Replacement
e) Combustion

26. Using the five types of reactions listed above, classify **AND *<u>balance</u>*** the following equations:

___$Al_{(s)}$ + ___$Fe_2O_{3(s)}$ → ___$Al_2O_{3(s)}$ + ___$Fe_{(s)}$ _____

___$H_{2(g)}$ + $O_{2(g)}$ → ___$H_2O_{(l)}$ _____

___$C_8H_{18(l)}$ + ___$O_{2(g)}$ → ___$CO_{2(g)}$ + ___$H_2O_{(g)}$ _____

Predicting Products:

27. Predict the products of the following reactions **AND** balance.

Reaction	**Products**
$AgNO_3$ (aq) + KCl (aq) →	
$(NH_4)PO_4$ (aq) + $CaCl_2$ (aq) →	
NH_4NO_3 (aq) + NaCl (aq) →	

Net ionic equations:

28. Write the complete molecular equations and the net ionic equations

a. sodium phosphate reacts with ruthenium(VI) nitrate

b. Mercury (I) Nitrate reacts with Calcium Chloride

Molecular Geometry

29.

Complete the following table for Molecular Geometry..

Total e- pairs	Shared Pairs	Unshared Pairs	Molecular shape and name (Draw out)	Example
2		0		
				GaF_3
	2	1		
		0		CH_4
			Trigonal pyramidal 	
				H_2O